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Breaking the
Biomass Bottleneck…


Why forest restoration?

In summary: forest fire without restoration…

...forest fire after restoration

Typically, forest restoration in Arizona generates:

20 to 30 green tons of small diameter logs per acre…

…and 10 to 30 green tons of logging residue (tree tops, branches, pre-commercial saplings, etc.) per acre.

Traditionally, piling and burning has been the way to dispose of the logging biomass (tree tops, branches, etc.).

This worked as long as restoration projects were limited to a few thousand acres in the Wildland Urban Interface (WUI).

But when biomass piles become too big, pile burning intensity creates collateral damages such as adjacent tree mortality and soil sterilization.

This negates some of the benefits of restoration.

And when there are too many biomass piles, the quantity of smoke becomes unacceptable.

In addition, 4FRI pile burning at landscape scale would cost the Forest Service over $1.5 million per year.

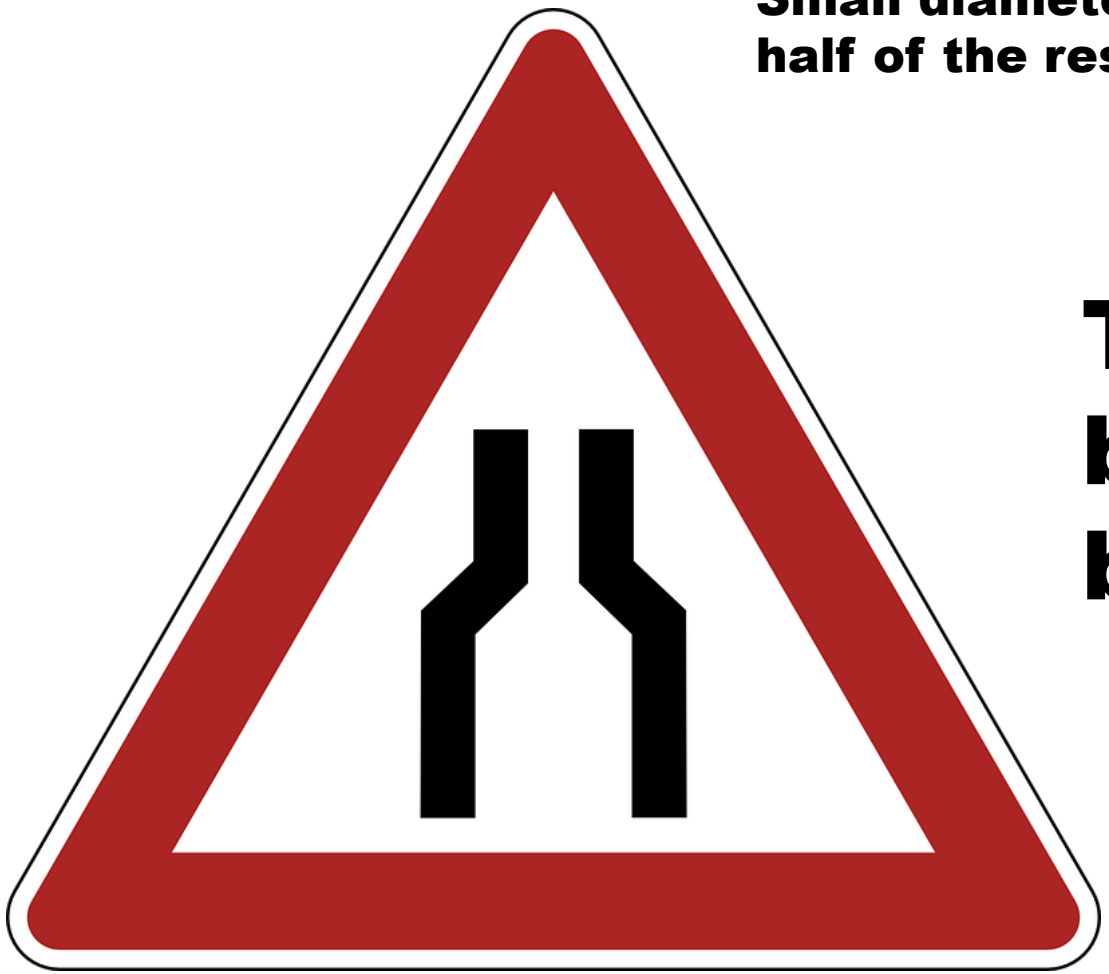
That money will be better spent 'prepping' acres for restoration.

With restoration ramping up to landscape-scale, 4FRI will generate over 1 million tons of logging biomass every year.

This is simply too much biomass to pile and burn.

Restoration cannot be scaled up unless field biomass removal and disposal is scaled up.

Small diameter log utilization is only half of the restoration solution.



This is the biomass bottleneck.

How do we break the biomass bottleneck?

Independent Science News

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HOME » (UN)SUSTAINABLE FARMING »COMMENTARIES »ENVIRONMENT » CURRENTLY READING:

Biofuel or Biofraud? The Vast Taxpayer Cost of Failed Cellulosic and Algal Biofuels

Despite massive state and federal grants and loan guaranties, cellulosic biofuels are not ready (yet?) for industrial scale in a competitive market economy.

The now-bankrupt Kior site In Columbus, Mississippi.

Biochar may become an option, but it is not (yet?) scalable at the million tons / year level in an economically viable way.

The Phoenix Energy's 500 kilowatt biomass gasifier in Merced, California. It only produces about one ton of biochar per day.

In Arizona's climate, composting works, but aerobic digestion takes 6 months to turn biomass into finished compost, and the profit margins are so thin that the main question remains: how do we pay for the transportation of the biomass?

Full Circle Compost composting site in Nevada.

Wood pellets are economically viable, but they require sawmilling residue “clean chips” (i.e. fiber), not “dirty chips” (including bark and needles) logging residue.

The Forest Energy plant in Show Low Arizona uses clean chips..

Converting a coal power plant to biomass or a combination biomass / natural gas is a major capital investment and would likely require more biomass than will be available from 50,000 acres of forest restoration per year.

Co-firing biomass with coal works, but the SRP test burn results show (so far) that only 2% of biomass can be added to 98% of coal, if the power plant is to operate reliably and economically. This could contribute ~5,000 acres toward the 50,000 acres annual goal.

SRP Coronado Generating Station in St. Johns, Arizona test burning a mix of 2% biomass and 98% coal.

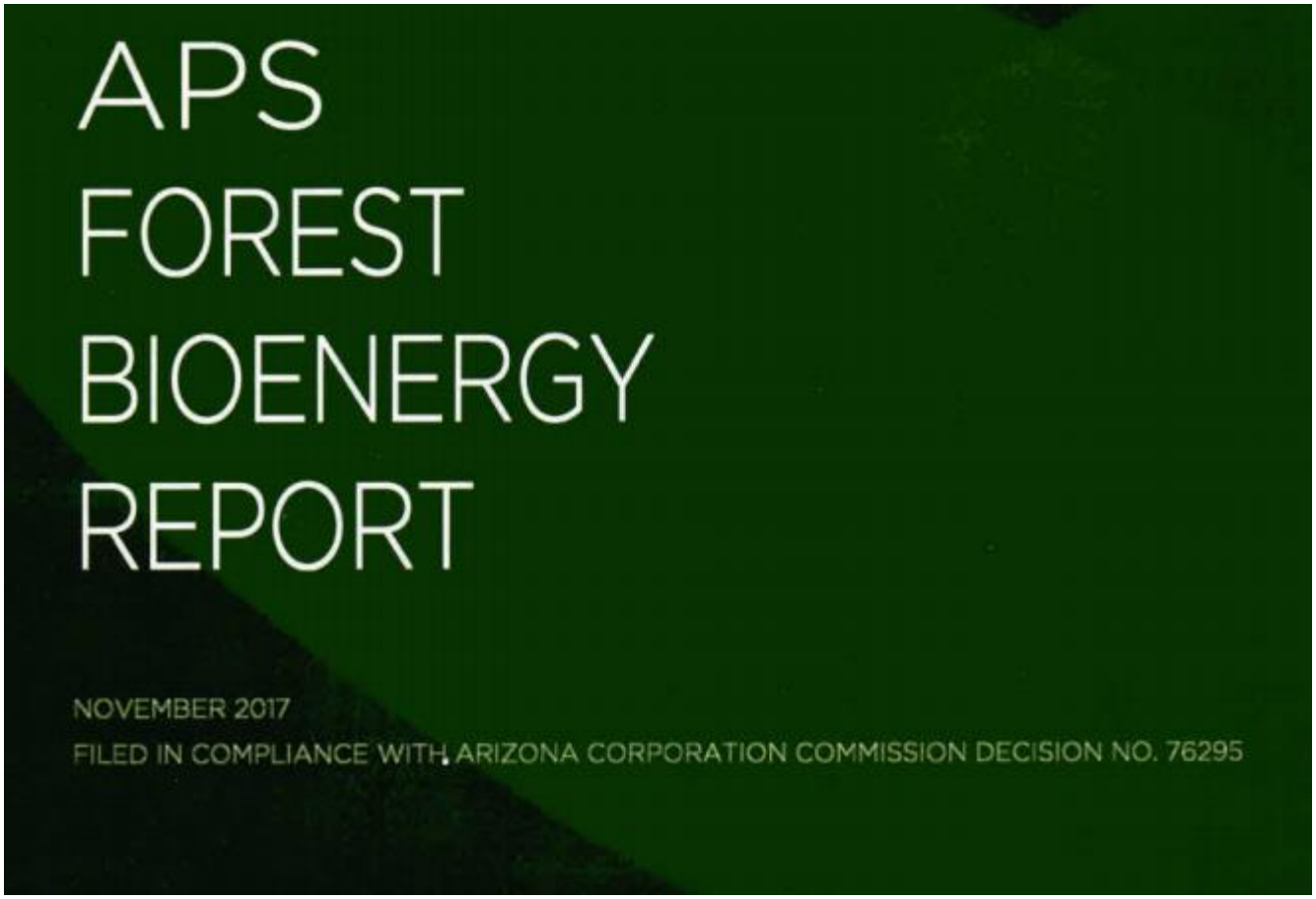
The sole Arizona biomass power plant is currently the only solution capable of disposing responsibly of logging residue "dirty chips" at landscape scale. It currently enables the restoration of 15,000 acres in the White Mountains, but its capacity is maxed out.

NovoBioPower in Snowflake, Arizona produces up to 28 megawatts of electricity with 39 employees and contributes directly $12 million into the White Mountains economy.

Arizona currently has the capacity to dispose responsibly of about 15,000 acres' worth of logging biomass per year. We need to increase this capacity 3.5 fold in order to allow ramping up forest and watershed restoration to the 50,000 acres 4FRI annual goal.

How do we do it?

NovoBioPower in Snowflake, Arizona absorbs ~300,000 green tons of logging biomass per year, or less than a third of the ~1 to 1.5 million tons that 4FRI will generate at full implementation.



- **Obviously a good faith effort looking seriously at the issues.**
- **Solid first step in establishing a baseline for various discussions.**
- **Credible “high cost” scenario.**

Next steps, Next questions?

CapEx

Can a "here & now" CapEx cost for an out-of-state modern idled 60 MW plant, drive the cost of the project from $7M down to $2M per MW, and the price of a potential PPA from $180 to $200 down to $120 to $140 per MW ?

Restoration Acreage

Can a new contract with the Forest Service create the supply conditions to allow 60 MW to dispose of 30,000 acres worth of Ponderosa Pine logging slash, i.e. can Novo and the "medium scenario" together meet the 50,000 acres 4FRI annual objective ?

Rate Payers

Can a lower CapEx cost and a lower PPA price drive the impact on rate payers down to $1.5/month, or maybe less than $1/month, for an additional 60MW plant bringing 4FRI to 50,000 PIPO acres/year ?


Thank you
Questions?